

585-649 Mamre Road, Orchard Hills

Operational Noise Assessment - Lot 7 (Snack Brands)

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1 INTRODUCTION

Acoustic Logic Consultancy has been engaged to undertake an assessment of the proposed development on Lot 7 of the industrial subdivision at 585-649 Mamre Road, Orchard Hills.

The proposed works at Lot 7 consist of the development of a single warehouse to be used by Snack Brands as a logistics warehouse. This assessment includes:

- An assessment of noise generated by the operational activities created by Lot 7.
- An assessment of construction noise associated with the development.

In this report, we will:

- Identify nearby noise sensitive receivers and operational noise sources with the potential to adversely impact nearby development.
- Identify relevant Penrith City Council and Environmental Protection Agency (EPA) acoustic criteria applicable to the development.
- Identify operational and construction noise sources and predict operational noise emissions and assess them against acoustic criteria.
- If necessary, determine building and/or management controls necessary to ensure ongoing compliance with noise emission goals.

This report is based on drawings by *Nettletontribe Architects* (drawing reference 10736_DA, Issue A).

2 SITE DESCRIPTION AND PROPOSED WORKS

The Mamre Road industrial subdivision is located at 585-649 Mamre Road, Orchard Hills.

The subject site is Lot 7 in the nine lot subdivision, located on the east of the development with frontage to Mamre Road.

The proposed development consists of the construction of a logistics warehouse and associated facilities, namely:

- A warehouse to be used for logistics, incorporating high bay and low bay warehousing. The gross floor area of warehousing and associated office proposed is 30, 225 sqm;
- An approximate total of 15 loading docks, with 8 to be recessed;
- A two level general office attached to the warehouse;
- A two level dock office located at loading docks;
- Truck hardstand and parking area
- On grade passenger vehicle parking with approximately 70 spaces.

The warehouse operation is proposed to operate twenty four hours per day. This is consistent with Consent Condition C13 of SSD 7173

Vehicular access to the subdivision is via internal roadways within the subdivision, off Mamre Road.

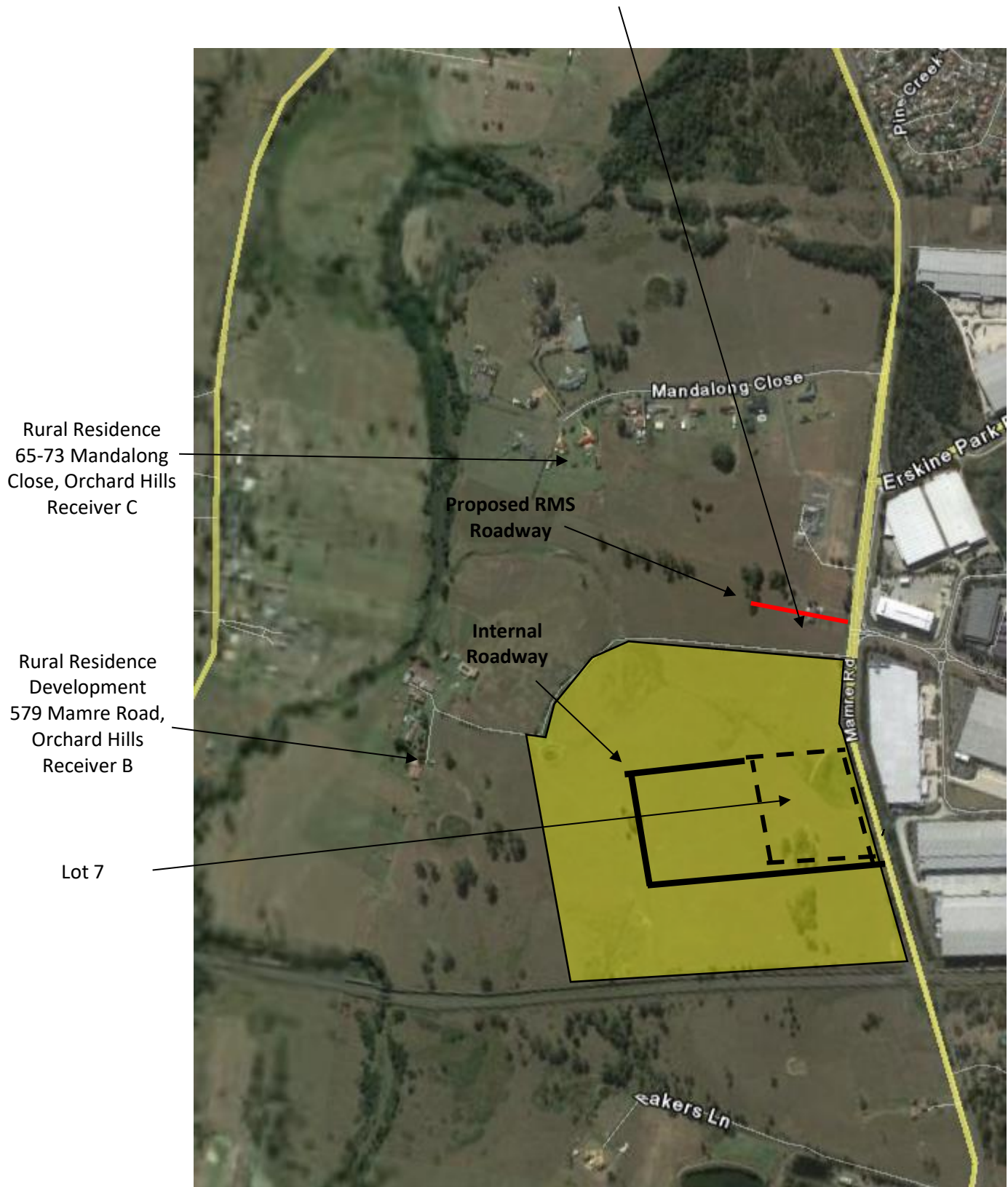
Development in the vicinity of Lot 7 is as follows:

- Lot 7 is in the eastern portion the subdivision, and bounded by a mixture of existing and proposed industrial development.
- Residential development in the vicinity of Lot 7 is as follows:
 - The nearest residential development (Receiver A, 573-577 Mamre Road) lies approximately 400m to the north, although we note that this site is proposed to be acquired by the Roads and Maritime Service.
 - The next nearest residence is at Receiver B, 579 Mamre Road, approximately 700m to the west, which is owned by the developer of the subdivision.
- The nearest residences that are not proposed for imminent acquisition or owned by the developer are at 65-73 Mandalong Close (Receiver C – north-west of the site), approximately 800m away.

The primary existing noise source in the vicinity of the site is road traffic from Mamre Road.

See aerial photograph below.

Residence to be acquired by RMS
(573-577 Mamre Road) – Receiver A)



3 NOISE DESCRIPTORS

Environmental noise constantly varies. Accordingly, it is not possible to accurately determine prevailing environmental noise conditions by measuring a single, instantaneous noise level.

To accurately determine the environmental noise a 15-20 minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In analysing environmental noise, three-principle measurement parameters are used, namely L_{Max} , L_{90} and L_{eq} .

The L_{90} measurement parameter is a statistical level that represent the average minimum noise levels (quietest 10%), over the measurement intervals.

The L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the 15 minute period. L_{eq} is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

L_{Max} level represents is the loudest noise event during a measurement period, and is used in the assessment of sleep disturbance for intermittent peak noise events at night time.

5 DEVELOPMENT CONSENT (SSD 7173)

Development Consent for the site has been approved, subject to the conditions contained in Application Number SSD 7173. Conditions relating to noise impacts are detailed in this Section.

5.1 HOURS OF WORK – CONDITIONS C13 & C14

C13. *The applicant shall comply with the hours detailed in Table 1, unless otherwise agreed in writing by the Secretary.*

Table 1 – Hours of Work

Activity	Day	Time*
<i>Earthworks and Construction</i>	<i>Mondays – Fridays</i>	<i>7.00am – 6.00pm</i>
	<i>Saturdays</i>	<i>8.00am – 1.00pm</i>
<i>Operation</i>	<i>Mondays – Sundays</i>	<i>24 hours**</i>

**Note – This excludes works on public holidays*

***Refer to Condition 17*

C14. *Works outside of the hours identified in Condition 13 may be undertaken in the following circumstances:*

- a) Works agreed to in writing by Council or the Secretary;*
- b) For the delivery of materials required outside these hours by NSW Police or other authorities for safety reasons; or*
- c) Where it is required in an emergency to avoid the loss of lives, property and/or prevent environmental harm.*

5.2 CONSTRUCTION NOISE LIMITS - CONDITION C15

C15. *The Development shall be constructed with the aim of achieving the construction noise management levels detailed in the Interim Construction Noise Guideline (Department of environment and Climate Change, 2009). All reasonable and feasible noise mitigation measures shall be implemented and any activities that could exceed the construction noise management levels shall be identified and managed in accordance with the management and mitigation measures outlined in the EIS.*

Construction noise and vibration impacts have been assessed in accordance with *Interim Construction Noise Guideline* (Department of environment and Climate Change, 2009). Criteria and assessment of construction noise and vibration have been presented in Section 6 and Section 7.2 respectively.

5.3 OPERATIONAL NOISE LIMITS – CONDITION C16

C16. The Applicant shall ensure that noise generated by operation of the Development does not exceed the noise limits in Table 2.

Table 2 – Operation Noise Limits dB(A)

Location	Day <i>L_{Aeq}(15 minute)</i>	Evening <i>L_{Aeq}(15 minute)</i>	Night <i>L_{Aeq}(15 minute)</i>	Night <i>L_{A1}(1 minute)</i>
<i>Receiver A</i>	39	39	35	48
<i>Receiver B</i>	39	39	38	49
<i>Receiver C</i>	36	36	35	49

Note: Noise generated by the Development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy. Refer to the plan in Appendix 4 of this consent for the location of residential receivers.

We note that the residential receiver locations detailed in this Condition are consistent with the locations of receivers assessed in this report.

6 CONSTRUCTION NOISE AND VIBRATION IMPACTS

6.1 INTERIM CONSTRUCTION NOISE GUIDELINES 2009

EPA guidelines adopt differing strategies for noise control depending on the predicted noise level at the nearest residences:

- *“Noise affected” level.* Where construction noise is predicted to exceed the “noise effected” level at a nearby residence, the proponent should take reasonable/feasible work practices to ensure compliance with the “noise effected level”. For residential properties, the “noise effected” level occurs when construction noise exceeds ambient levels by more than:
 - 10dB(A)_{Leq(15min)} for work during standard construction hours (7am-6pm Monday to Friday and 8am to 1pm on Saturdays) and
 - 5dB(A)_{Leq(15min)} for work outside of standard construction hours.
- *“Highly noise affected level”.* Where noise emissions are such that nearby properties are “highly noise effected”, noise controls such as respite periods should be considered. For residential properties, the “highly noise effected” level occurs when construction noise exceeds 75dB(A)_{Leq(15min)} at nearby residences.

In addition to the above goals for residential receivers, the NSW EPA Interim Construction Noise Guideline nominates a management level of 70dB(A) _{Leq(15min)} at commercial receiver facades (typical office, retail), and 75 dB(A) _{Leq(15min)} at industrial receivers.

A summary of noise emission goals for standard hours of construction work are presented.

Table 3 – Construction Noise Emission Goals

Location	“Noise Affected” Level - dB(A) _{Leq(15min)}	“Highly Noise Affected” Level - dB(A) _{Leq(15min)}
Residences	48	75
Commercial	70	N/A
Industrial	75	N/A

6.2 CONSTRUCTION VIBRATION

Vibration goals for the amenity of nearby land users are those recommended by the EPA document *Assessing Vibration: A technical guideline*. These levels are presented below:

Table 4 – Construction Vibration Goals

Location	Time	Peak velocity (mm/s)	
		Preferred	Maximum
Continuous Vibration			
Residences	Daytime	0.28	0.56
Commercial/Industrial	When in use	0.56	1.12
Impulsive Vibration			
Residences	Daytime	8.6	17
Commercial/Industrial	When in use	18	36

7 NOISE EMISSION ASSESSMENT

An assessment of operational and construction noise is presented below. The following noise sources are assessed:

- Operational noise from the proposed Snack Brands logistics warehouse within Lot 7:
 - Noise from internal activities within the warehouses (use forklifts or similar for materials handling).
 - Noise from external areas (heavy vehicles and forklifts on site)
 - An assessment of noise from mechanical plant.
- An assessment of construction noise.

7.1 ON-SITE OPERATIONAL NOISE (VEHICLE INGRESS/EGRESS, MATERIALS HANDLING).

Operational noise generated on the site is assessed with reference to Consent Condition C16 of SSD 7173, relating to the development.

In predicting operational noise emissions, the following assumptions have been made:

- That there are heavy vehicle movements on site. During a typical 15 minute period, we have assumed there will be one inbound or outbound semitrailer movement to/from the proposed warehouse in Lot 7 (ie – two movements at the site in a 15 minute period).

We note that the projected truck movements over a 24 hour period for the site are as follows;

- B-Double truck movements
 - Inbound – 50 movements in, and 50 movements out
 - Outbound – 64 movement in, and 64 movements out
- 40 foot container movements
 - Inbound – 5 movements in, and 5 movements out
 - Outbound – 5 movements in, and 5 movements out
- Truck movements detailed above are consistent with the predicted peak night time heavy vehicle movements assumed for this assessment, i.e. two movements at the site in a 15 minute period.
- A sound power of 100-105dB(A) has been adopted for the heavy vehicle (b-double).
- Continuous operation of a forklift (sound power 94dB(A)) in the hardstand area.
- The cumulative impact of vehicle noise and the internal activity noise is taken into account.

In addition, the predictions also take into account:

- Air-absorption.
- For night time operations, the noise increase as a result of adverse weather (temperature inversion at night) is taken into account.

As is consistent with EPA guidelines when assessing rural development, the noise emissions are assessed at a point on the residential properties which is 30m from the location of the house.

Table 5 – Noise Impact Assessment (Evening/Night)

Noise Source	Noise Receiver Location	Predicted Noise Level * dB(A) $L_{eq(15min)}$	Compliance
Internal and External Site Activity	Residential Receiver A (573-577 Mamre Road)	34 dB(A) $L_{eq(15min)}$ *	Complies – Night time criteria (35dB(A) $L_{eq(15min)}$, Table 2)
	Residential Receiver B (573-577 Mamre Road)	30 dB(A) $L_{eq(15min)}$ *	Complies – Night time criteria (38dB(A) $L_{eq(15min)}$, Table 2)
	Residential Receiver C (65-73 Mandalong Close)	34 dB(A) $L_{eq(15min)}$ *	Complies – Night time criteria (35dB(A) $L_{eq(15min)}$, Table 2)

* Predictions takes into account air absorption and adverse weather conditions (wind or temperature inversion at night time). Calculation done as per table 5.10 *Engineering Noise Control* Beis and Hansen 1988.

Analysis of noise emissions indicates that operational usage of the warehouse will be compliant with Consent Condition C16 of SSD 7173 relating to the development, even during the night time period.

7.1.1 Transient Noise Events (Sleep Arousal)

Noise events occurring between 10pm and 7am should be assessed for potential sleep disturbance impacts on nearby residents.

The primary potential noise source will be the use of the pneumatic valve which engages when a truck stops. Based on measurements conducted by this office, the sound power of this noise event is 113dB(A) $L_{1(1min)}$.

The noise emissions at the window of the nearest residences are presented below. Predictions take into account distance correction and air absorption.

Table 6 – Sleep Arousal Assessment (Truck Air-brake)

Noise Source	Receiver Location	Predicted Noise Level	Noise Limit	Compliance
Truck Brake	Residential Receiver A (573-577 Mamre Road)	44dB(A) L_{Max}^*	48dB(A) $L_{1(1min)}$	Complies.
Truck Brake	Residential Receiver B (573-577 Mamre Road)	39dB(A) L_{Max}^*	49dB(A) $L_{1(1min)}$	Complies.
Truck Brake	Residential Receiver C (65-73 Mandalong Close)	44dB(A) L_{Max}^*	49dB(A) $L_{1(1min)}$	Complies.

* Prediction takes into account air absorption and adverse weather conditions (wind or temperature inversion). Calculation done as per table 5.10 *Engineering Noise Control* Beis and Hansen 1988.

Noise emissions from the truck brake are predicted to be less than the noise limits set for intermittent peak noise events in Table 2. On this basis, use of the site between 10pm and 7am to allow for vehicles to enter/leave the site) is compliant with Consent Condition C16 of SSD 7173, relating to the development.

7.1.2 Mechanical plant

Detailed review of all external mechanical plant should be undertaken at construction certificate stage (once plant selections and locations are finalised). Acoustic treatments should be determined in order to control plant noise emissions to the levels required by Consent Conditions of SSD 7173 relating to the development, and detailed in Table 2.

Compliance with noise emission requirements will be achievable with appropriate acoustic treatment. It is unlikely that any large externally located equipment (even if used at night) will require acoustic treatment.

We note:

- Primary external mechanical plant is likely to consist of air-conditioner condensers serving office areas and smoke exhaust fans.
- Condensers serving office areas will typically have a sound pressure level of no more than 65dB(A) at 1m distance, and will not require any form of acoustic treatment to ensure compliant noise emissions.
- Smoke exhaust fans generally operate only in emergency, and are exempt for typical operational noise controls. If used for the purpose of ventilation (relief air mode), fans will not require any form of acoustic treatment provided that they have a sound pressure level of no more than 70 dB(A) at 3m distance. In the event that fans exceed this noise level, acoustic treatment to the fan discharge (internally lined ducting or acoustic attenuator) will be required.
- Any externally located back up diesel generator is to have a noise level of no more than 80 dB(A) at 7m distance (this will necessitate a proprietary enclosure), and is to be located such that the building shell acts as a noise screen to the nearest dwelling to the immediate north (as is indicated on current architectural drawings referenced in Section 1 of this report).
- If an occupant of the warehouse in Lot 7 were to install large external equipment which is operated at night time (such as refrigeration plant), in the event that the sound power of the plant exceeds 100dB(A), it is likely that a noise screen around the equipment item will be required (such that the line of sight between the equipment item and any residence is broken).

7.2 CONSTRUCTION IMPACTS

7.2.1 Construction Noise

With respect to construction noise, the impact on nearby development will be dependent on the activity in question and where on the site the activity is undertaken. Given that civil works at the site are complete, asphaltting works are likely to be the loudest construction activities associated with the site.

Equipment items will typically have sound power levels of approximately 110-115dB(A)_{Leq(15min)}. Predicted noise levels at nearby development are:

- Up to 50 dB(A)_{Leq}, at the nearest residence (Receiver A - to the north) during construction of the Lot 7.
- This is a minor exceedance of the EPA “Background+10dB(A)” noise emission goal for construction noise (48dB(A), during the daytime as per table 8), and would not typically require further noise management.
- Noise levels at other residences (Locations B, C and D to the west, north and south respectively) will comply with the 48dB(A) noise goal.

In light of the above, for Lot 7, construction noise management is not likely to be required, given the distance from the site to the nearest residences. Construction activities should take place during the hours of works approved in high level of assumed level of vehicle use will still be compliant with Consent Conditions of SSD 7173 relating to the development detailed in Table 1.

7.2.2 Construction Vibration

Excavation, earth retention and civil works are the primary vibration generating activities.

Given the distance between the Estate and the nearest residential buildings, it is unlikely that construction vibration will exceed EPA guidelines (for amenity) and *highly* unlikely to approach vibration levels with the potential to cause building damage. Construction vibration mitigation is not warranted.

8 DISCUSSION/RECOMMENDATIONS

Acoustic analysis indicates that:

- Operational noise from Lot 7 can comply with Consent Condition C16 of SSD 7173 relating to the development.
- Noise from construction works in Lot 7 will generally comply with Interim Construction Noise Guidelines 2009, as required by Consent Condition C15
- To ensure ongoing compliance with operational noise requirements;
 - Between 10pm and 7am - It is assumed that there would not be more than 2 truck movements to the site in a 15 minute period.
 - Trucks with tonal reversing beacons in external areas are not recommended in external areas on the site.
 - If a diesel forklift is required for the purpose of large container movement, it is recommended that this only occur between the hours of 7am – 10pm. This restriction applies only until the acquisition of 573-577 Mamre Road.
- Detailed review of any proposed external mechanical plant should be undertaken at CC stage (once equipment selections are known). Given the distance from the site to nearby residences, it is unlikely that any form of acoustic treatment will be needed, however this should be confirmed once equipment selections are finalised.

9 CONCLUSION

Noise emissions associated with the use of Lot 7 at 585-649 Mamre Road, Orchard Hills have been assessed with reference to Consent Conditions of SSD 7173 relating to the development.

An analysis of typical operational noise (vehicle, mechanical plant/equipment) indicates that the proposed use of Lot 7 will be compliant with noise emission requirements provided that the recommendations in Section 7 of this report are adopted.

Noise associated with Lot 7 indicates that it is unlikely that exceedances of *Interim Construction Noise Guidelines 2009* criteria will occur at nearby residences, and it is unlikely that a detailed Construction Noise and Vibration Management Plan should be required in the event the development application for the site is approved.

Please contact us if you have any queries.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Alex Washer', with a stylized, cursive script.

Acoustic Logic Consultancy Pty Ltd
Alex Washer